

CLAIMS

1. A plastisol formulation, comprising:
 - a) a plasticizer or mixture of plasticizers; and
 - b) a mixture of polymer particles comprising at least two components A and B;
 - c) at least one member selected from the group consisting of fillers, coupling agents, stabilizers, desiccants, rheological additives, hollow bodies and mixtures thereof;

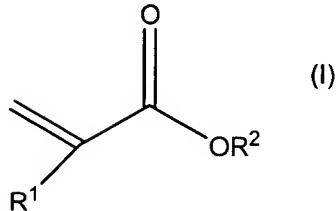
wherein said polymer particles comprising at least two components A and B have one of the following structures

 - 10 ba) a 2-stage structure, a 3-stage structure or multi-stage structure, or
 - bb) a gradient polymer structure.- 2. The plastisol formulation according to claim 1, wherein said component A comprises a polymer particle obtained by emulsion polymerization, said polymer particle having a core KA, an outermost shell S₁A, a second shell S₂A and a third shell S₃A;
- 15 wherein said component B comprises a polymer particle comprising a core KB, an outermost shell S₁B, a second shell S₂B and a third shell S₃B;

wherein said core KA comprises the following monomers in copolymerized form:

K A a) 10 to 50 percent by mass, relative to the core, of (meth)acrylates of Formula I

20



wherein

$R^1 = H$ or CH_3 ; and

$R^2 = CH_3$ or CH_2CH_3 ;

K A b) 50 to 90 percent by mass, relative to the core, of compounds of Formula I;

wherein $R^1 = H$ or CH_3 , and R^2 is selected from the group consisting of propyl,

5 isopropyl, tert-butyl, n-butyl, isobutyl, pentyl, hexyl, iso-octyl, octyl, cyclohexyl, 2-ethylhexyl, octadecyl, dodecyl, tetradecyl, oleyl, decyl, benzyl, cetyl, isobornyl, neopentyl, cyclopentyl, undecyl, and docosyl;

K A c) 0 to 10 percent by mass, relative to the core, of compounds that can be copolymerized with the monomers KA a) and/or KA b); and

10 K A d) 0.1 to 9.9 percent by mass of monomers containing an epoxy group;

wherein said outermost shell $S_1 A$ comprises the following monomers in copolymerized form:

$S_1 A$ a) 70 to 100 percent by mass of monomers of Formula I,

wherein

15 $R^1 = H$ or CH_3 , and

$R^2 = CH_3$ or CH_2CH_3 ;

$S_1 A$ b) 0 to 30 percent by mass of the monomer of Formula I, wherein the R^1 and R^2 have the meaning indicated for K A b); and

20 $S_1 A$ c) 0 to 10 percent by mass of a monomer copolymerized with $S_1 A$ a) and $S_1 A$ b);

wherein said second shell $S_2 A$ comprises of the following monomers in copolymerized form:

$S_2 A$ a) 20 to 80 percent by mass of monomers of Formula I, wherein

$R^1 = H$ or CH_3 , and

25 $R^2 = CH_3$ or CH_2CH_3 ;

S₂ A b) 20 to 70 percent by mass of the monomer of Formula I, wherein

R¹ = H or CH₃, and

R² has the same meanings as for K A b); and

S₂ A c) 0.1 to 9.9 percent by mass of monomers containing an epoxy group;

5 wherein said third shell S₃ A comprises the following monomers in copolymerized form:

S₃ A a) 30 to 100 percent by mass of monomers of Formula I, wherein:

R¹ = H or CH₃, and

R² = CH₃ or CH₂CH₃;

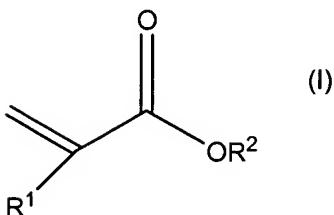
10 S₃ A b) 0 to 70 percent by mass of the monomer of Formula I, wherein:

R¹ = H or CH₃, and R² has the same meanings as for K A b); and

S₃ A c) 0 to 10 percent by mass of a monomer that can be copolymerized with S₁A) to S₁A), the monomers having the meanings indicated for K A c);

wherein said core KB comprises the following monomers in copolymerized form:

15 K B a) 10 to 50 percent by mass, relative to the core, of (meth)acrylates Formula I



wherein

20 R¹ = H or CH₃; and

R² = CH₃ or CH₂CH₃;

K B b) 50 to 90 percent by mass, relative to the core, of compounds of Formula I,

wherein R¹ and R² have the meanings indicated for K A b);

K B c) 0 to 10 percent by mass, relative to the core, of compounds copolymerizable with the monomers KB a) and/or KB b); and

K B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups,

S₁ B a) 70 to 100 percent by mass of monomers of Formula I, wherein:

5 R¹=H or CH₃, and

R²=CH₃ or CH₂CH₃;

S₁ B b) 0 to 30 percent by mass of the monomer of Formula I, wherein:

R¹ and R² have the meaning indicated for K A b);

S₁ B c) 0 to 10 percent by mass of a monomer copolymerizable with S₁ B a) and/or

10 S₁ B b); and

S₁ B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups;

wherein said second shell S₂ B of polymer B comprises the following monomers in

copolymerized form:

S₂ B a) 20 to 80 percent by mass of monomers of Formula I, wherein:

15 R¹=H or CH₃, and

R²=CH₃ or CH₂CH₃;

S₂ B b) 20 to 70 percent by mass of the monomer of Formula I, wherein:

R¹=H or CH₃, and R² has the same meanings as for K B b); and

S₂ B c) 0.1 to 9.9 percent by mass of monomers that are capable of a nucleophilic

20 reaction with the epoxide-containing monomer of polymer A;

wherein said third shell S₃ B comprises of the following monomers in copolymerized form:

S₃ B a) 30 to 90 percent by mass of monomers of Formula I, wherein:

R¹=H or CH₃, and

25 R²=CH₃ or CH₂CH₃;

S₃ B b) 10 to 70 percent by mass of the monomer of Formula I, wherein:

R¹ =H or CH₃, and R² has the same meanings as for K B b);

S₃ B c) 0 to 10 percent by mass of a monomer copolymerizable with S₁B a) and/or

S₁B b), the monomers having the meanings indicated for K A c); and

5 S₃ B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups.

3. The plastisol formulation according to claim 1, wherein a mixing ratio of components A and B ranges between 100:0 and 20:80 parts by weight.

4. The plastisol formulation according to claim 1, wherein a mixing ratios relative to the total mass of the component A have the following values:

10 (K A) 20 to 90 percent by mass,

(S₁A) 10 to 80 percent by mass,

(S₂A) 0 to 70 percent by mass, and

(S₃A) 0 to 70 percent by mass.

5. The plastisol formulation according to claim 1, wherein a mixing ratio relative to
15 the total mass of the component B has the following values:

(K B) 20 to 100 percent by mass,

(S₁B) 0 to 80 percent by mass,

(S₂B) 0 to 70 percent by mass, and

(S₃B) 0 to 70 percent by mass.

20 6. The plastisol formulation according to claim 1, wherein said component A
represents a gradient polymer, wherein the proportions by mass relative to the polymer A are
as follows:

(K A) 0 to 90 percent by mass, and

(S A) 10 to 100 percent by mass.

25 7. The plastisol formulation according to claim 1, wherein said component B

represents a gradient type, wherein the proportions by mass relative to the polymer B are as follows:

(K B) 0 to 90 percent by mass,

(S B) 10 to 100 percent by mass.

5 8. A method for coating of a metal sheet, comprising:

contacting a metal sheet with the plastisol according to claim 1.

9. A metal sheet coated with a plastisol formulation according to claim 1.

10. A vehicle, at least partly coated with a plastisol formulation according to claim 1.

11. A method for underbody protection of vehicles, comprising:

10 contacting a underbody of a vehicle with the plastisol formulation according to
claim 1.